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THE UNIVERSITY OF CHICAGO
DEPARTMENT OF THE HISTORY OF ARTS
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CHICAGO, ILLINOIS

TO THE HONORABLE SENATE OF THE UNIVERSITY OF CHICAGO
FOR THE PURPOSE OF RECOMMENDING TO THE SENATE
THE APPOINTMENT OF THE CURATOR OF THE MUSEUM OF ARTS
AND THE RECOMMENDATION OF THE SENATE TO THE BOARD OF TRUSTEES
OF THE UNIVERSITY OF CHICAGO

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JOURNAL
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DESIGN OF THE MODERN INDUSTRIAL PLANT

Edward X. Tuttle,¹M. ASCE
(Proc. Paper 963)

No one realizes better than the City Planner himself how far his responsibilities extend; what diverse factors in modern society he is required to integrate; and what opposing interests he must reconcile. An industrial Architect, however, is in a position to realize that the Planner's attention to trends in the design of industrial plants has been increasing, and that decisions made by the Architect and his client profoundly affect city planning.

Before discussing some of these trends, however, it is advisable to consider a more fundamental area of contact between the Planner and the Architect.

Many Planners are occupied and preoccupied with the "downtown dilemma," with toll road locations, and expanding port and other terminal facilities. One of the outstanding factors in these and many of their other problems is change; the dynamic quality in the race, and particularly in America, that causes it to progress rather than to decay and go the way of the dinosaur and lemming.

Anticipation of, and preparation for change is a responsibility of the Planner and of the Architect. Both must be sensitive to changing social pressures and to the effects they will have upon the community: local, regional, and national. Of course, it would have been impossible to anticipate and prepare for the automobile in 1890. Some Planners, however, did have the vision and courage to prepare for population growth which would require substantial increases in transportation arteries and terminals.

One of the most magnificent examples of such architectural foresight is Grand Central Station in New York City. True, its carriage entrances are inadequate for the vast flow of automobile traffic that feeds the train-a-minute schedules, but, fifty-five years ago, the architect developed a scheme of traffic circulation which readily handled the movement of a few thousand people to and from trains, restaurants, shops, and laboratories, and which today serves the same purpose for hundreds of thousands. Of course, the facility is overtaxed, but a commuter can still run for the 5:21 without bumping his fellow commuters.

Note: Discussion open until October 1, 1956. Paper 963 is part of the copyrighted Journal of the City Planning Division of the American Society of Civil Engineers, Vol. 82, No. CP 2, May, 1956.

1. Vice-Pres., Giffels and Vallet, Inc., L. Rossetti, Assoc. Engrs. and Architects, Detroit, Mich.

The environmental changes which have been met so successfully by Grand Central Station are immediately apparent; but some of the changes presently occurring in the outlook of industrial designers are not so widely known.

The evolution of factory design was rather a slow process until about twenty-five years ago. Since then the development has been rapid and new concepts of operation, distribution, and design have been flowing from conferences, table cloth talks, and the journals in flood proportions. Many magic words and phrases have been kicked about, and misused, and some of them such as automation, mechanical handling, self-regulating, feedback, etc., are showing signs of wear.

After sifting the claims, prejudices, clichés, and transitory verbiage regarding contemporary industrial facilities, three outstanding considerations appear to dominate all others. These three are: (1) physical conditions of human toil, (2) flexibility, and (3) automation. Actually these considerations have always existed, but it is only recently that they have become dominant.

Man is the only animal that has any far-reaching control over his environment. He is not essentially lazy, but through the ages he has steadily reduced the proportion of his lifetime spent in toiling to produce his food and shelter, and has increased the proportion available for recreational and intellectual pursuits. At the same time he has improved the quality of his food, shelter, and amusements; his health has improved, and his life span has increased. He has, by his indomitable will, raised himself up into cleaner air, breathed deeply, and felt a loss of burden; he has found that freedom is highly desirable, and he refuses to go back but will step briskly on and up.

There has always been the kindly type of employer who has provided his workers better than customary working conditions, together with health and other personal services; although until fairly recently it was unusual for an employer consciously to consider such a course in terms of investment for increased production and profit.

In the present day, however, the consensus of enlightened employers and employees alike is that both production and standards improve as individual burdens decrease. If we accept this notion, it does not require a very difficult mental effort to realize that conditions can be created in man's living and working environment that will improve his productive ability and add pleasure to his life.

For example, studies have demonstrated that the efficiency of workers can be improved by the installation of appropriate, controlled lighting. Worker efficiency is likewise improved by adequate, easily accessible, well maintained locker and lavatory facilities. Good housekeeping has become a by-word in the vocabularies of industrial managers, and the benefits to be derived from its application can be predicted with a fair degree of precision.

There is, however, a wide range of thought regarding conditions of work which is not as well established nor as widely accepted as the foregoing. There has been a considerable amount of experimentation with the systematic application of color on all building and equipment surfaces in industrial installations. Thousands of workers all over the country in both plants and offices are supplied with (or subjected to) music "piped" to them from central record playing devices.

At this point it may be pertinent to discuss briefly the so-called "black-out" type of plant. Pompous as it may seem to say, the sun is a very unreliable source of light for factory work. There are too many various obstructions to the passage of light from the sun. Clouds, smoke, fog, dust, and

dirty glass combine to make dependence upon daylight impossible for even distribution or constant intensity of light. Furthermore, maintenance of large areas of glass, skylights, and monitors is costly. There is, however, a psychological factor involved in the use of windows which cannot be ignored. People want to be able to look outdoors and gratify their instinctive urge to survey the landscape and observe the weather. They want to speculate on the advisability of trying to work in the garden tonight, or of going fishing tomorrow, or they want to worry about having failed to close the bedroom window. The trend is well established toward the substitution of ventilators where needed for monitors or other skylights, and the use of a continuous narrow band of windows in otherwise plain factory walls. Thus the workers' desire to look out can be satisfied, and interior light and atmospheric conditions can be economically and accurately controlled.

In efforts to create a climate for worker health, well-being, and satisfaction (and, as an end result: efficiency) managements have invested huge sums in the development of recreational facilities for employees. They have provided tennis courts, baseball diamonds, basketball courts, gymnasiums, family picnic areas, libraries, amateur theaters, gun ranges, numerous types of adult education facilities, and vacation camps. They have provided cooperative stores, bus-lines, health services, and legal, architectural, and banking services.

These widely varying efforts have met with equally varying success. Some of the schemes have been abandoned and others devised to replace them.

These projects and services have not been adopted entirely as a result of union demands. They represent, rather, the combine efforts of management and workers to reduce man's burden and increase his standard of living.

A tremendous amount of further research is needed in this field. We have very little accurate data upon man's reaction to a well-landscaped plant, to access to playing grounds and personal services. Studies are being made, and contemplated, which will make it possible to determine far more accurately than at present in what direction aid to whatever management should go in the provision of these aids and adjuncts to manufacturing.

In spite of loud complaints, disagreements, violence, and viewings with alarm, enlightened management and labor leaders have one aim in common: that of placing the man at his task with the health, peace of mind, and energy required to produce the food, shelter, and goods, both required and desired, for him and his family in the shortest time possible. When there is disagreement it is usually in regard to methods, not results, and research will inevitably reduce these areas of disagreement.

Let us proceed to the second dominant consideration mentioned above: flexibility.

Until thirty or forty years ago a manufacturing plant was apt to be a multi-story, ugly pile of stone, brick, concrete and/or heavy timber. It was cluttered with a disorderly maze of pipes and obsolete or occasionally used equipment. It had been added to and altered over the years and often occupied the entire tract of land upon which it sat. The location may have been profitable, but making it so was becoming more difficult.

In this period some men in Detroit were developing new concepts concerned with manufacturing techniques. Henry Ford, Albert Kahn, William Knudsen, and the firm of Giffels and Vallet, Inc., were designing and building plants on one floor because they had reached the conclusion that it was more efficient to roll, skid, or otherwise move materials and parts in process

horizontally than vertically. These same people and soon many others were developing ideas about over-all process and fabrication planning. Thus, before much thought in designing was given to structure, times and movements were set and equipment layouts established. It was only necessary then to put a tent over the mechanism. One often hears it said that a modern industrial plant is a process with a building wrapped around it. This has a logical ring but is not necessarily true.

The Winchester Model 12 shotgun has been made for many years, and probably one can still buy elastic sided Congress shoes; but refrigerators, automobiles, farm implements, furniture, and many other appliances and materials that we use change models and formulae frequently. The changes may be major or minor, but they require the alteration of machine tools, and the relocation or extension of all parts of the process.

When a plant is initially designed it may appear economical to provide, say, a fourteen foot clearance under trusses and twenty foot column spacing, to place as much plumbing as possible along one side of the building, and to locate toilet rooms on the floor as centrally as possible. Yet in a few years model changes and new processes, perhaps requiring overhead conveyors, heat treat units, or equipment served by piping in different locations may make the plant almost unusable.

There is a strong trend toward the design of plants which are related to the process size and shape in only a general way, and which anticipate changes. Clearances and column spacing may be greater than immediately needed, waste lines and other piping may be laid in a grid that can be tapped anywhere, and may be placed, along with toilet rooms and other obstructions above the working floor areas in the webs of trusses. Structures may be designed and placed on the land in such a way as to facilitate expansion in any desired direction.

An industrialist today is considered conservative if he purchases only four times as much land for his plant as the initial buildings will require. Thousands of plants in this country have expanded to the limits of their property and their owners have been forced to purchase or lease expensive property for worker parking, or for inefficiently located warehousing, or for auxiliary fabrication.

You can swing a cat in a comparatively small area, but when you get a lion by the tail, and you may, you want some wide open space.

No discussion of the modern industrial plant would be complete without some mention of automation. There is a connotation of the ultimate in the word, but it would probably be more accurate to say that we are in the antepenultimate stage of industrial evolution toward automatic factories. Push-button factories are rare and are not apt to be common for some time. Prejudice on the part of consumers, managers, and labor are important factors in delaying the realization of the greatest benefits to be had from completely self-regulating processes.

We can, however, expect a rapidly increasing use of automatic and semi-automatic machinery and equipment. As machinery becomes more complex and accomplishes more of man's work, it occupies space formerly occupied by the man. Thus the amount of factory space required per man is increasing. Furthermore, the increasing complexity of machinery requires a concomitant upgrading of operating personnel. High school and trade school educations are becoming inadequate for mounting numbers of workers at all levels. Educational upgrading of society will, as it always has, go hand in hand with higher living standards.

It is important that the Planner and the Architect be conscious of these trends because they will seriously affect regional, local, and plant space requirements. They will also force planners to re-examine residential density predictions and regional plans.

In the matter of regional planning, one of the most successful commissions is to be found in the Detroit metropolitan area. After many discussions with its Executive Director, T. Ledyard Blake, it appears evident that Detroit City Planners are looking far into the future, are taking a broad view of the requirements for industrial development, and at the same time, are providing for residential growth (and its protection) which will make it possible for workers in industry to feel safe in their investment in a home at a reasonable distance from their place of employment and their community center.

New attitudes toward the treatment of changing processes of manufacture, and increasing mechanization are part of the problems faced by both the Planner and the Architect. All of these problems are dominated by change in general. Hence it is that at least in the past a designer could reasonably expect his decisions to be valid for at least his lifetime, today in order to fulfill that expectation he must orient himself not only to "changes" but to "change" itself.

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URBAN REDEVELOPMENT CAN IMPLEMENT MASS TRANSIT

William M. Claire,¹ M. ASCE
(Proc. Paper 964)

SYNOPSIS

The complex problem of circulation confronting every American city of size demand comprehensive, imaginative, and courageous solutions. There is no short-cut or easy way out of modern traffic dilemma. One large short-coming of urban transportation is the increasing inadequacy of rapid mass transit. The convenience of good transit service generates business and enhances property values in the vicinity of the transit facility. The thesis of this paper is the implementation of a modern rapid mass transit system or parts of a system in a urban area, by means of the financial arrangement of the high first cost of the transit facility being shared by the property value benefits generated thereby through planned redevelopment of the areas of the city benefited by the transit facility.

INTRODUCTION - EXISTING CONDITIONS

Legislative Framework

Urban redevelopment, the clearance and rebuilding of blighted areas by the cooperative action of government and private enterprise, is gradually taking the important place it deserves in the elimination of outmoded tenements and other substandard living conditions, and the reconstruction of the cleared area into modern, efficient, and needed improvements according to an overall plan. Most of these projects are primarily concerned with residential units before or after redevelopment, or both, according to existing law. More than 250 American communities are progressing in this work under the Urban Clearance Program of the Housing and Home Finance Agency.²

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1. Asst. Exec. Director, Los Angeles Community Redevelopment Agency, Los Angeles, Calif.
2. See ASCE Proceeding - Separate 785, City Planning Division, "Urban Redevelopment and the Rebuilding of American Cities" by J. W. Follin, M. ASCE.

The State of California Community Redevelopment Law set forth in considerable detail the definition of blight as substandard living environment, inadequate street system, or lack of community facilities, etc., but does not confine redevelopment work to housing only. Blight may be of an economic nature evidenced by decreasing tax revenue, tax delinquent land, or other forms of economic deterioration. Another feature of this law of interest to the theme of this paper is authority to use the tax revenue increase from a redevelopment project to repay any net project cost. The net project cost may be defined as the difference in cost between acquiring and clearing the land and selling the cleared land to private enterprise for redevelopment. After the net project cost is retired, all tax revenue thereafter goes to the normal taxing bodies. It should be mentioned here that the provisions of the Housing Acts of 1949 and 1954 as passed by the Congress include grant monies to cover up to two-thirds of the net project cost, the community being responsible for the other third. An example of this is presented just before conclusions of this paper. Several other states allow non-residential redevelopment projects in their legislation but California is believed to be the only one with the tax-revenue-increase-use feature.

Thus, it is possible in California cities, at least to include as part of a redevelopment project or solely as the project, under certain circumstances, a portion of a rapid mass transit system as the land reuse (or subterranean or superterranean land reuse). Before pursuing this idea further here, there are two other subjects concerned with Existing Conditions that bear on the overall theme, namely, Urban Strain and the Obsolete Circulation System we have inherited.

Urban Strain

Several research works of recent years are concerned with the affect of our modern way of life on the human body, nervous system, and general well-being. Some of these studies reveal an alarming increase in mental illness, juvenile delinquency, crime, divorce, suicide, physical breakdown or failure of one kind or another. Surely, one cause of these results must be the strain of living in cities as they have been allowed to grow. Building our cities has nearly always out-distanced planning them. Will this rate of growth continue? There are indications it may not only continue but rise sharply upward with the natural increase of birth rate over death rate and the surge of population from rural to urban areas. Future urban strain could be greater than at present, if broad corrective measures are not pressed soon.

The causes of urban strain that we can help correct as civil engineers and planners are legion. They may be those associated with the physical senses or mental or emotional welfare. Regarding the physical senses—what we see, smell, hear, and feel—consider the frustrating sight of traffic congestion, the smell of exhaust, the noise of subway or el, the feeling of fatigue from a long bus ride standing up or a long, cold wait for a street car. Regarding mental reactions to any every-day method of getting to and from the city, consider the danger, the delay, the uncertainty, the anxiety, and the economic aspects the commuter is confronted with. As we devise means to eliminate or at least reduce this strain, we would do well to consider carefully the causes thereof and pattern the new system of movement of people in the city accordingly.

Obsolete Circulation System

Technological advancement of the automobile, bus, and light-weight electric computing train help us focus sharply on the great gulf between progress in these fields and the lack of progress in related fields necessary to enjoy these inventions, such as city planning, public administration, and urban (not municipal) government. For example, streets designed for wagons, carriages, and horseback riders are somewhat hard-put to accommodate 220-horsepower automobiles. The subject of how obsolete our circulation system has become is well covered in a recent writing³ of note by Harmer E. Davis, A.M. ASCE, Director, Institute of Transportation and Traffic Engineering, University of California, who states "Perhaps an even more significant result of jammed streets is the fact that elapsed travel time from home to work or to shop is now increasing; for people in many of the suburbs, the time to make the trip downtown by either automobile or public transit is approaching the point of being intolerable, at least as a daily matter."

Downtown is not unique in this matter of strangled streets. Already in the Los Angeles metropolitan area several satellite communities are experiencing the same crush of too many automobiles for the limited street capacity available. Gradually the vacant parcels and areas between downtown and the satellites and between the satellites themselves are filling in with new development, where terrain permits, in addition to new suburbs in outlying areas, all of which further overloads the obsolete street system. Aggravating the matter still further are changes in mode of transportation from street car and buses to automobiles.

Freeways have relieved the situation at some localities and further complicated it at others, especially downtown. The traffic generated by freeways has rendered circulation within the central business districts of some cities practically impossible at morning and particularly evening peak hours. This is not applicable to those downtown areas where parking space supply is far behind demand. The downtown street pattern is one of the basic causes of the poor circulation and not the freeway. The freeway is one of the bold measures we need to help solve the transportation dilemma and many more miles of them are necessary. However, freeways alone are not solving the overall urban transportation problem and fall short of providing the convenience, safety, and low cost features the commuters need. Redevelopment can provide a transit facility with all of these features.

Planning for Future Urban Transportation

Last meeting called on December 16, 1955 by Dean Arthur Gallion, School of Architecture, University of Southern California, on the subject of city and regional planning a prophecy of Los Angeles growing to be the world's largest city by 1975 was made with the added prediction that there will be 4,000,000 automobiles there by then. Most American urban areas may expect similar growth to a greater or lesser degree in the future. We are not concerned here with competing with the automobile in future urban circulation planning but in gearing our transportation economy in cities to the tremendous traffic loads ahead and should start making plans for these loads now. This matter

³ ASCE, City Planning Division, Proceeding - Separate 769, "Some Observations on the Urban Transportation Problem," Aug. 1955.

demands prophetic wisdom we have not used yet, a planning bravery we have not dared, and financial resources or programming not yet tapped.

Unified Transportation

The proposed solution to the circulation problem to follow in this paper would more likely be workable with a unified system of urban movement of people on a metropolitan area-wide basis. Unification as used here may be considered the integration of all media of moving people within the urban area including transfer privilege from one to the other, the prearranged scheduling of trips to complement each other's service, and elimination of unprofitable service duplication. This subject is treated at length⁴ by William Reid, President, Hudson and Manhattan Railroad Co. New York, a noteworthy quotation from which is included here; "Rail lines should most logically be used for mass transportation to the heart of the area, with feeder bus lines and private cars serving the rail-loading points."

The unification should include all methods of moving people and the storage areas of vehicles temporarily at rest. Thus we are concerned here with the coordination of railroad, subway, elevated, trolley-bus, street car, bus, automobile, and moving sidewalks in connection with trackage, freeways, streets, parking facilities, and pedestrian ways. Such an approach to people getting to and from work and moving within the urban complex should precede any comprehensive measures proposed as a solution to the circulation problem. Private enterprise can handle this assignment and should. Where it seems too complicated for immediate undertaking, governmental assistance should be sought and may precipitate the cooperation needed for private action.

Convenience

The city attracts people and holds them as inhabitants for probably many reasons as there are persons. Some of the obvious attractions are job security or diversity, the herd instinct (friends and relatives), or variety of opportunities, cultural interests or recreation. Underlying them all is an ultra-attraction-convenience. We live in a city for its interesting work, inspiring worship, congenial company, educational advantages, and to participate in some of its many professional, cultural, business, or fraternal groups. But these advantages must be convenient and easily reached with a minimum of delay. Time and distance are involved here. We are at their mercy instead of in control of them.

An urban dweller with convenience at his command is able to conduct his business or profession with greater efficiency, move between home and office with less strain and time loss, or the shopper can cover more store counters in the same span of time.

Mr. Louis Kitchen, Kansas City redeveloper, describing a questionnaire he sent his Quality Hill tenants made the statement that over 90% gave as a reason for desiring residence there as convenience to work, shopping, recreation, and other downtown attractions.

4. ASCE, City Planning Division, Proceeding-Separate 171, "Unified Mass Transportation System for New York" February 1953.

Convenience rates high in the mode of transportation we select for commutation. The automobile is selected for its convenience even though it is usually the most expensive way to and from work. If a more efficient means of moving people in the city were also more pleasant, dependable, economical, and convenient, the commuter would readily be attracted to it. It could be that such a facility has never been put to use yet.

Density

One further consideration is necessary before the redevelopment-transit idea is described—density of population. The City of Los Angeles has an average density of population of about 11,500 persons per square mile in the 175 square mile inner core of the city. This density is sufficient to support a modern subway according to Dr. Henry A. Babcock, Los Angeles Consulting Engineer and Land Economist. Greater population density is destined for parts of the Los Angeles area in the near future. In addition to Chicago's 15,000 persons per square mile and New York's 24,000 there are several other cities with densities capable of supporting high-speed modern mass transit now. However, there are many American urban areas with a population density not sufficient to justify modern transit and where the need is pressing.

Since a rapid transit facility can eventually generate the density necessary for support of the facility, a tremendous advantage may be gained through redevelopment to provide the transit facility and the supporting density simultaneously. This uses redevelopment as a catalyst to bring together the transit facility and the users on a planned basis instead of waiting years for the natural process of greater densities to develop through unplanned and unreliable growth.

The Redevelopment-transit Plan

Clean Collar

The clearance of the collar of blight around the central business district of most cities presents the chance of the century for the birth or continuation of a modern rapid mass transit system with radial and cross-town lines at least in the central core of the city. The private development around each transit station would be planned through redevelopment to provide the population density to make the transit facility feasible.

Economic Necessity

The extension of transit lines is possible through unblighted areas as an economic necessity to the community. Additional legislation in some states may be required to satisfy this condition. The economic necessity is the protection of the investment of billions of dollars in downtown areas. The transit facility could be planned to provide this protection.

Mutual Benefit

The planned transit facility is feasible with the required population density planned at the same time and thereby mutually benefit each other. The typical transit station proposed here is illustrative of the type just outside of the central business district. Large apartments would be grouped near the

station. Smaller apartments and single family homes would be located just beyond the large apartments. Commercial facilities would be located above the station and include complete neighborhood shopping stores and services, integrated automobile parking where all-day storage would be encouraged, convenient indoor street car or bus stops with transfer privilege. Industrial development could be provided in the plan beyond or with residential areas properly coordinated therewith.

The transit station in the central business district would be integrated by ramps, escalators, and moving sidewalks with department stores, office buildings, hotels and government centers with free interchange by transfer to bus, street car or other methods of movement.

Project Financial Planning

The cost of the transit line and station is coupled with the cost of the improvements at and adjacent to the station in the financial program of the redevelopment project or projects.

The gross project cost of a redevelopment-transit project like the typical transit station outside the central business district would include the right of way for the transit facility on either side of the station for a distance of halfway to the next station where a similar redevelopment project has been completed, is under way, or is proposed for the future) the station grounds, and the building sites for the commercial and residential development. The net project cost or write-down would be the difference between the acquisition and clearance cost and the amount received from the cleared land for the purposes described above.

The transit line and station could be publicly or privately owned and still take advantage of the write-down. The other improvements would be privately owned.

Tax Revenue Increase

The tax revenue increase from the redevelopment project after completion of the new improvements would be used for as long as necessary to retire the net project cost. Thereafter all tax revenue would flow to the normal taxing bodies.

Preliminary figures on the Bunker Hill Urban Renewal Project in downtown Los Angeles are of interest here concerning the use of the tax revenue increase and the high density residential and commercial development proposed. The gross project cost preliminary estimate is \$40,000,000 and the net project cost \$21,000,000 after the sale of the cleared land at \$19,000,000. The Housing and Home Finance Agency in Washington has a capital grant reservation of \$14,000,000 for the project. The \$7,000,000 City of Los Angeles share is proposed to be paid by the tax revenue increase in only a few years after redevelopment is completed. The present taxes are about \$32,000 and the conservatively estimated revenue after completion is \$2,058,000, an increase of \$1,724,000. The tax revenue from a redevelopment-transit project would in all probability far surpass the figures above particularly if the transit facility were privately owned.

CONCLUSIONS

The urban circulation assistance idea in this paper is not a simple solution—nor is the problem presently a simple one. The future holds added complexities to the problem. Required is a unified transportation system and redevelopment legislation broader in scope than that intended to correct only housing deficiencies. The redevelopment law should also permit the use of the tax revenue increase to retire net project cost. Finally, the idea needs competent and imaginative technical talent to develop the plan and concerted community support to arouse public interest therein and carry through to completion. We have the freedom, knowledge, energy, materials, capital, and spirit to convert our mistakes of the past into achievements of the future, where we will not only just live in our cities but have life more abundantly as God intended we should.

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TRANSPORTATION PLANNING: PROSPECTS FOR COORDINATION

Burton W. Marsh,¹ M. ASCE
(Proc. Paper 988)

FOREWORD

This paper is one of a group given at Princeton University, Princeton, New Jersey, on October 28, 1955, at a special program of the City Planning Division in conjunction with The Green Foundation School of Engineering and The Bureau of Urban Research. It was designed to focus attention on the importance of the function of Transportation and to explore the possibilities for achieving in practice vitally needed coordination of all forms of transportation planning.

The following papers comprise the program: "Transportation Planning: The Port—A Focal Point" (Proc. Paper 893) by Roger H. Gilman, Director of Port Development, Port of New York Authority, New York, N. Y.; "Transportation Planning: The Airport, A National Facility" (Proc. Paper 894) by Wilfred M. Post, Jr., Manager of the Allentown-Bethlehem-Easton Airport, Allentown, Penna.; "Transportation Planning: Prospects for Coordination" (Proc. Paper 988) by Burton W. Marsh, Director, Traffic Engineering, Automobile Association of America, Washington, D. C.

These papers presented first a discussion of the necessity for coordinated transportation planning in a port area where rail, water, and truck transportation must be planned on the basis of interrelated land use. Then the complex land use patterns involved in airport planning were discussed. One set of needs is generated by an airport as a link in a continental transport system and another often conflicting set of needs is generated by the function of the port as a local land use in the community it serves. Finally, a look at the prospects for the coordination of transportation was developed. Such current advances as Atomic power, airport zoning, jet planes, electronic controls and rail-truck "piggy back" operation were related to basic land use, and a basis for discussion of things to come was established.

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1. Director, Traffic Eng. and Safety Dept., Am. Automobile Assn., Washington, D.C.

SYNOPSIS

It is pointed out that in the past, coordination in transportation planning has been almost completely lacking. This has been due, in part, to traditional American attitudes and to competition among modes of travel, an abundance of transportation facilities, and separate regulatory agencies with consequent separate regulatory measures applied to different types of common carriers of passengers. These factors are, in part, responsible for the deterioration of passenger transportation services in metropolitan areas.

The author, however, believes that passenger-transportation conditions in metropolitan areas have now become so bad that key people in these areas have come to recognize the need for effective cooperation, if solutions to these problems are to be found and effectuated. Some groups are already beginning effectively to attack, cooperatively, urban-transport problems as well as other metropolitan-area problems like the development of water, the provision for large-scale sewage disposal facilities, elimination of smog and of blighted areas, providing community parking facilities, and similar urban problems.

The author anticipates more such cooperation among municipal agencies, and civic and planning groups, in an effort to solve some of the present-day acute metropolitan transport problems.

Appraised in terms of the past, the prospect for coordination of transportation planning would have to be reported as mighty poor. But new conditions, new factors, new problems and new elements have come into the picture. Careful consideration of these impress the student that the prospects for coordination of transportation planning are encouraging indeed, especially where the need is most urgent, in the major metropolitan areas.

In the main, in this country, each of the four major forms of transport—rail, highway, water and air—has gone its independent way without regard to the impingement, or effect of what it did or what it desired or planned to do, upon the other forms of transportation, or upon the economy and welfare of the country as a whole. There has been a very definitely uncoordinated situation to which various factors have contributed—and we might just quickly review a few of these. They are familiar to you, but I think there would be merit in looking at them just for a moment.

1) One is the basic American attitude of letting businesses develop their own place in the picture, their own potential, and not interfering with them—letting the free competitive forces play and having a minimum of interference with the evolution and development of "the American way of life."

2) Another point—we have been blessed for a long time with a relative abundance of transport in all categories as they have evolved, and these have been available to shoppers and travelers throughout the country. This situation has been possible because of our very favorable conditions as to resources and high productivity, with high standards of living. This abundance has contributed to general acceptance of conditions, and to less pressure to examine the problems involved and to consider the effects of free competitive evolution than has our economy been more strained.

3) Another factor has been unwillingness of leaders of the various forms of transport to cooperate one with another. True, they have cooperated on some matters. But basically they have desired to be left alone and all too much they have not, in relation to transportation matters as a whole, desired to cooperate.

4) Another problem which has bothered some forms of transportation more than others is lack of uniformity of regulatory practices. Regulatory measures have borne with different weight upon different forms of transport. The railroads, for example, feel that the regulatory measures which affect them are unduly heavy, compared to those affecting their principal competitors for the movement of goods.

5) Finally, there has been a tendency to regulate separately for each form of transportation. There has not been coordination as to regulation. One result has been to encourage special pleading for each type of transportation. This applies both as to regulations and as to use of public funds.

Separate consideration of the different fields of transportation leads to undesirable results. General Lacey V. Murrow, who has been very active in many phases of transportation, has given a good example. He pointed out that at the conclusion of the last war, the U.S. Government sent four separate teams to China in an effort to improve the transportation situation there. These four separate groups were composed of competent engineers and specialists in their own fields. These teams worked independently and the result was that each attempted to solve the transport problem of China from the point of view of the particular part of transportation which that group represented. The Chinese were naturally less than completely pleased with results. For the Chinese couldn't afford the kinds of duplicatory transportation facilities which we have.

In the Philippines, we have attempted to assist on transportation improvements. Again, there has been failure to consider transportation needs as a whole, but instead to consider separately the needs of particular types of transportation. One result has been a multiplicity of regulatory bodies somewhat similar to what we have, and certainly not suited to the best interests of the Philippines.

We have some serious national transportation conditions. For example, our railroads are in serious trouble. And from the point of view of our country and its defense and its over-all economy, this is not good. Furthermore, it is of great importance that reasonable solutions be found so that our railroads will be brought back to and retained at a state of health and strength. It's something to which some of the younger persons are going to have a chance to make a contribution, because the troubles are not going to be eliminated quickly. Perhaps this is one of those situations which has had to become very serious before there is adequate corrective action.

There are other important national transportation problems. However, at this point I turn to the metropolitan areas. These are areas in which coordination of transportation planning is very important, and probably the areas of greatest interest to you. Furthermore, they are areas for which such planning is no longer an academic, but a problem which is, or is fast becoming, URGENT. Mr. Gilman's paper provided excellent evidence.²

2. "Transportation Planning: The Port-A Focal Point" by Roger H. Gilman. Proceedings, ASCE, Vol. 82, CP 1, Proc. Paper 893, February, 1956.

Perhaps the best example of a bad situation in metropolitan areas is in the field of transit. Basically it is the result of the growth of use of passenger cars as a means of transportation in metropolitan areas. In consequence, an essential factor in metropolitan living involving an important industry—public transportation—is in serious trouble almost everywhere. It is obvious that something must be done about the metropolitan transit problem—and the need is for action NOW.

However, the need is for coordination of transportation planning. The objective as between public transportation and passenger car transportation should be to achieve a reasonable balance between the two, giving full recognition to the advantages and disadvantages of each.

Instead of such a sensible approach, what did I find in my study preparatory to this presentation? In one of our largest cities, they were about to make a transportation survey—or that's what it was asserted to be. But inquiry showed that it was actually going to be limited almost entirely to a TRANSIT SURVEY. I asked: "Why isn't it going to be a transportation survey, as it says it is?" The answer was very forthright: "The reason is that all the attention in recent years has been directed to the other elements of highway transportation and therefore this is going to be almost entirely a transit survey."

There has been a great deal of attention to other elements of highway transportation and not enough attention to transit. But when a great community indicates that it is going to make a transportation survey and then it turns out that it is going to be a transit survey, that is going too far in the other direction. For this is not a matter of having either one or the other. Both forms of transportation inevitably will continue—and the need is to work out a reasonable balance. Yet this important survey seems unfortunately to be losing track of this main objective.

In contrast, I have talked to a person who is well informed about a similar problem in another major city. There, they had just had a major transportation study and that study had almost not one iota about transit in it; that is equally ridiculous! You wouldn't think that in such major cities the people involved would allow myopia to affect their decisions. This latter was a study designed to ascertain needs for express facilities in the metropolitan area. But when I asked the question: "What about transit?" little would be said about it. When I pressed further, I was told: "In making this survey, the point of reference used was that there would be no substantial transit changes." Do not these two cases emphasize the need for a new approach in coordination of transportation planning?

Consider now another case—a western city of great importance. Here is a summarized content from its 1953 report to legislature: "A satisfactory solution is not to be achieved by building highways and facilities for automobile transportation alone." Now that's absolutely right. But note this: "— the solution can be reached only through mass rapid transit designed to move people rather than cars." Two points herein warrant comment. First: "only through mass transit"—note this lack of breadth again—and second: "to move people rather than cars." How do you move people if not in some kind of vehicular units? Of course, this is only a case of poor expression—what they intend to indicate is that transit vehicles carry many more persons per

vehicle than do passenger cars. So just a minor point. The major point is that here are important groups in major cities dealing with a dynamic, urgent problem but not approaching it broadly, not taking account of all related transportation.

Transportation is an urgent problem today. But think for a moment about the traffic growth potential—the potential of a doubling in highway traffic in just two short decades; remember that half or more of our traffic is now in these metropolitan areas. So, it would be natural to assume that this doubling would tend to apply to traffic in metropolitan areas. Here, however, there must be inserted a large IF—if the things are done which will permit that sort of growth to occur. With growing realization of the significance of that IF, motor vehicle manufacturers are going to take a greatly increased interest in you people who are doing planning work. For I believe they realize or will come to see that the future of their business, their ability to sell millions of cars per year, is going to be based not mainly on the pocketbooks of our people but on highway transportation facilities, governmental structures and patterns of organization which will assure the meeting of transportation needs, both physical and operational.

But to return to troubles that occur because of the lack of coordination. Let's look a little further.

A friend knew a brilliant young lady who had come to work in the Nation's Capital and who found residence in Virginia. Where was she going to work? "Oh," she said, "I'm going to work over in Washington in the Ring Building." The Ring Building is on the northwestern edge of the central business district. "That's fine," he said, "How are you going to get there?" "Why," she said, "the bus goes right by here just a little down the street, and I'm going to take the bus over and transfer to the Ring Building." Said he, "Sorry, but you can't do that. There isn't that kind of a coordinated arrangement. You must take the bus to the central part of Washington. Then you can hire a taxicab, or walk, or take another bus and pay another fare to make the trip to the Ring Building."

As to meeting reasonable metropolitan transportation needs, the situation is ridiculous. Yet, in the Washington metropolitan area, we have a number of non-coordination examples. Certain taxicab trips in the Washington metropolitan area involve limitations which are not in the interest of riders. Lack of transfer arrangements between buses of companies serving different parts of the city and suburban areas, is another example.

The lack of proper terminals is a good example of the present inadequacy of coordination in this field. Chicago is a case in point, with its numerous railroad terminals and the general inability of us folk in the East going West without changing stations at Chicago.

One hears much about the speed of air travel—and of plans for providing yet faster airplanes. Yet, what about the often long times spent getting to the airport, and from the terminal airport to your business destination? Existing transportation facilities from the airport to the center of the city or from the center of the city to the airport constitute another good example in a great many communities of the lack of needed coordination. Fortunately, this situation is being much improved in some communities.

Consider the lack of proper planning in connection with the Pittsburgh

airport parkway. A new divided highway was recently completed to serve that important, fine airport—and built to take care of traffic in a splendid way. What's happening? Its capacity and effectiveness are already being seriously reduced because of two basic deficiencies: local authorities do not have adequate powers (1) of zoning, and (2) of access control. They are now going to try to get the State to take over the divided highway so that access control and proper zoning can be used to avoid further deterioration of its effectiveness. Here is a good example of failure of coordination in planning which is affecting transportation seriously.

Walter Kurylo, of the Bureau of Public Roads, provided an interesting example in relation to the navigational clearances of bridges.³ Under regulations developed long ago under greatly different conditions, clearance requirements under bridges on navigable streams were set to safeguard often very few watercraft, with little regard for highway transportation. High bridges are usually costly, and if the bridges open for ship passage, highway or railroad traffic is delayed. Often before construction of such a bridge, people in highway transportation have pointed out how unreasonable such costs and delays would be, but to no avail. Instead, often millions of dollars have been spent for navigational clearances—for what? For a few boats now and then—not warships, not important industrial ships, but relatively unimportant shipping. Until recently, no attempt was made to determine whether the added bridge or other overland transportation costs resulting from watercraft requirements were offset by equal or greater savings in waterway transportation costs.

Now, however, through what is a fine example of coordination and common sense, the situation is now going to be vastly different. The Bureau of Public Roads was, I believe, the catalyst on this. Through the Under-Secretary for Transportation of the Department of Commerce, 10 Federal agencies, 40-odd state highway departments and some 60 railroad representatives were brought together thoroughly to study and consider this bridge clearance problem. As a result, a sensible approach will from now on be used. Bridge clearances are going to be set in terms of what can be justified considering the relative importance of the water, railroad, and highway transportation, and the over-all costs involved. It may be very important, as in many port areas, that certain bridge clearances be kept high or that movable spans be provided. There are other places where high bridge clearances or movable spans will be found unjustified and where the requirement for adjustment will be put on the small number of watercraft which are involved, even to requiring hinged masts, smokestacks, etc.

As to the economic value of such studies, Mr. Kurylo says: "The value of such studies is evidenced, for example, by expected savings estimated at \$3,400,000 in the cost of constructing two bridges across the Potomac River in Washington, D.C. . . ." Similar savings, estimated at \$825,000 were reported in Chicago last year. A low-level fixed bridge was approved for construction across the North Branch of the Chicago River at Fullerton Avenue.

3. "Bridge Clearances: The Interest of the Bureau of Public Roads" by Walter Kurylo. Proceedings, ASCE, Vol. 82, WW 2, Proc. Paper 936, April, 1956.

This action will permit construction of bridges upstream from Fullerton Avenue as fixed structures. The total long-range savings expected to be achieved in that one example may well exceed \$6,000,000 in bridge construction costs, to say nothing of annual savings as to bridge operation and maintenance through elimination of movable spans.

Growing Metropolitan Area Problems

Our urban and metropolitan areas have been growing very rapidly, at the expense of rural areas. One development which had its effect was that at the time of World War II many workers came in from rural areas and never went back. This shift in American life has some very interesting and to us important aspects. Many people have been moving to or locating in the suburbs—indeed this also has been a marked trend. However, we must keep in mind too that recently urban redevelopment and renewal developments are making headway and are again making attractive various centrally located urban areas. Comparatively, this is a much smaller development than that toward suburban living. This tremendous suburban development—involving not only residences but huge shopping centers—has created severe transit problems. When cities were closely knit, transportation by streetcar or other public transit vehicles was a “natural” and served city areas efficiently and economically. But the dispersion of population involved in the suburban changes, has made it very difficult if not impossible to serve such gigantic areas by public transportation with attractively frequent service and low fares. The rapid growth of highway traffic has brought huge problems as to provision of traffic arteries and terminal facilities—both parking and loading.

Another metropolitan area characteristic is the multiplicity of governmental agencies—and this poses some serious problems known to you all. This multiplicity of governmental jurisdictions constitutes one of the stumbling blocks in developing proper transportation plans for these areas.

Because of these and other difficulties, there is great need for better coordination of transportation in metropolitan areas. While progress will be slow and stumbling, nonetheless I believe that conditions are going to force advances in coordination of planning of metropolitan transportation. The need is being recognized; it is not just an academic problem. The problem is recognized by increasing numbers of persons as practical and important—indeed urgent or becoming urgent.

Examples of Progress

Mr. Gilman² gave a fine example in bringing out the broad-gauge views which the Port of New York Authority has taken on various matters. Many are not directly Port matters, but they relate so importantly to them that the Port of New York Authority—not limited by inadequate physical boundaries—has seen fit to give these matters very thorough study.

Let's look at a few other examples of growing interest in over-all transportation. At Northwestern University there is being set up a Transportation Institute. The confident prediction is that this is going to be a well financed,

important operation. People back of it realize that there just has to be a much better coordinated, integrated consideration of transportation problems. The Transportation Institute has the viewpoint that people who are going to have positions of top responsibility in one form of transportation need to know more about the other areas of transportation. They will then be less myopic concerning other forms of transportation. They will take a broader view, to the long-range benefit of transportation and generally of their own organization. This Institute will be a great clearing center and informational center, where there will be comprehensive reference resources for students who wish to study various transportation matters. It is going to provide graduate training to help produce more effective transportation administrators, staff specialists, etc. This will prove, I am confident, a development which will have a very significant impact upon the whole transportation picture as time goes on.

In Detroit, transit vehicles have their place in the planning of freeways. That may seem a very ordinary example of coordination planning—but it is really an important one. In fact, there are many places where in the evolution of the freeway plan, there hasn't been adequate consideration of transit needs of the area and how the freeway plan might help meet them and thus serve the people. In Detroit, an interesting sidelight is that the transit people themselves decided that as to stops or pick-up points, they won't stay on the freeway. They go off the freeway to pick the people up and then get back on. That concept poses additional planning and design problems—but it may prove its value.

In Chicago, wherever future transit service appears to be warranted in connection with a projected freeway or expressway, suitable facilities for transit will be built-in.

In Pittsburgh I saw at the City-County Building a large sign concerning the Allegheny County Transit and Traffic Commission—another example that transit and traffic are being considered together. I notice that Philadelphia has an Urban Traffic and Transportation Board—another example.

Now a few examples of how some communities are approaching the coordination of transportation planning. The first relates to Pittsburgh. Something has evolved there of tremendous importance to the coordination of transportation in that metropolitan area. It's an unique, outstanding example of what citizen-leaders can do—it is the Allegheny Conference on Community Development. To be sure of my facts, I visited the Allegheny Conference office. John Grove of that office stated that the Conference is impressed with the great importance of having a better integrated program for transportation for the metropolitan area in Pittsburgh, and that they are working on it.

Let's look for a moment at what this Conference is. It is an uniquely effective citizen mechanism for achieving results on major metropolitan area problems. Some of you may see something in this Conference concept that you can make use of now or later. How did it come into being? During World War II many leading Pittsburgh people were out of Pittsburgh. Richard K. Mellon, one of these persons, was in Washington. After the war, the question arose of whether some of these people would go back to Pittsburgh to live. At the same time, certain important industries in Pittsburgh were considering moving their headquarters out of the city. In some cases options had

been taken elsewhere because Pittsburgh was in such bad shape. There were numerous serious conditions—smog, blighted areas, bad housing, garbage disposal and river pollution, bad mass transportation, inadequate parking, traffic congestion, inadequate airports, flood conditions. Indeed, a Wall Street Journal analysis of conditions in some of the principal areas of this country following World War II put Pittsburgh's situation down as "very bad." Things indeed looked mighty serious!

Then came an idea. Some say it originated with Dr. Robert E. Doherty, President of the Carnegie Institute of Technology while others credit it to Wallace Richards, then Executive Director of the Pittsburgh Regional Planning Association. The basic idea was that one mighty effort should be made to "save the city," that new leadership was needed on these matters, and that it would have to come from the district's top executives.

The most important point is that top leaders of the metropolitan area DID decide to stand together and form an organization which would rise above all differences—some petty, above all complications, and all political jurisdictional problems of a metropolitan area. They would appraise the major needs of the area in the over-all, decide what was most needed, and then they would find a way to get those things done. The Allegheny Conference on Community Development resulted. Smog was selected as the Number One problem. Today, Pittsburgh is a vastly better place in which to live because smog, as Pittsburghers have so long known it, is a thing of the past.

Parking facilities have been greatly improved as a result of work stimulated by the Conference. Other major needs in the field of transportation have benefited or will, from the leadership of this Conference. Their procedure is this: when they decide that a serious problem deserves top priority, they find the most competent specialist or specialists available to counsel with them and to consult on the matter—and then there is devised the best plan and program for correction. Then the Conference backs up that plan and program! There is no coercion of municipal or county authorities. The Conference does, however, let those authorities know that persons having very large interests in the future of the Pittsburgh area want and will support these sound public improvement programs. The Conference has encouraged and supported a wide variety of measures, including some important legislative ones.

The organization will, I am confident, produce in time a much better coordinated transportation situation in metropolitan Pittsburgh. Mr. Grove told me that their greatest problem still is public transportation, despite high priority given to that subject. This shows that some transportation improvements are not easy to achieve.

Now to turn to a quite different approach—the very new San Diego Metropolitan Area Transportation Study. The City of San Diego, with leadership by its City Manager O. W. Campbell, realized the growing seriousness and importance of transportation problems in the San Diego metropolitan area. Counseling with a group of carefully-chosen advisers with competence in the field of transportation, there was extensive discussion of how best to solve the many complicated transportation problems. For some time, the idea was to bring in a consultant to make a thorough study and report. It was finally decided instead to employ, on a continuing basis, a specialist in transportation

who would act as sort of Transportation Coordinator for that metropolitan area. The person selected is employed by the City of San Diego—but his job is to work on the metropolitan transportation situation. With numerous governmental jurisdictions in the metropolitan area, there are obviously plenty of problems and inter-governmental complications. But already there is a growing cooperation toward solving problems of the area.

There are good reasons why progress is being made. Plans for this activity have been carefully laid with the continuing counsel of the group of specialist-advisers. There is no effort to rush things or to "railroad" ideas through without regard for the views of the many agencies properly interested. The transportation coordinator, whose actual title is Transportation Research Director, has a sensible pattern of objectives and plans, looking most importantly toward welding proper persons from the various municipalities in the metropolitan area, from the state, and even from the Armed Forces, into a coordinated transportation planning team. Already there is in operation an advance transportation planning team which "triggers" ideas. How did they get the staff for that key planning unit? The City Manager got the City Engineer to assign full-time, one of his competent design engineers. Similarly, the Traffic Engineer assigned an engineer to represent the traffic or operational point of view. The City Planning Department was sold on assigning a suitable planning specialist. These persons are devoting full time to this activity, which indicates the importance of proper transportation planning in the mind of the progressive city manager.

Another part of the plan is already in operation—a Technical Coordinating Committee. It is composed of department or division heads of the city, county and state, and also has representatives of the Federal Government and of related organizations such as airport managements, parking districts and transit companies. Plans also include keeping the public well informed, and providing frequent opportunities for getting the ideas and reactions of interested citizens.

There is much more to this significant development in the San Diego area; interested persons should contact Edward M. Hall, Transportation Research Director, City of San Diego, California.

Even the few examples cited indicate that there is no one established way to organize, to obtain properly coordinated transportation planning. On the other hand, the developments herein presented indicate that increasing numbers of persons in various metropolitan areas have concluded that some vastly more effective mechanism is essential in order to meet metropolitan transportation needs. Concepts on this matter are evolving. There is a challenge and an opportunity for persons such as those in this room to participate in developing effective answers to these challenging transportation problems.

Clearly, one of the key problems is that of suitable governmental organization in a metropolitan area to produce effective action on transportation and other metropolitan problems. In this connection, the recent developments in the metropolitan area of Toronto, Canada, are worthy of study. Indeed, this was one of the most interesting developments which I encountered in my study.

Again we find a key person giving outstanding leadership. In this case, it

was Frederick G. Gardiner, now Chairman, Municipality of Metropolitan Toronto. In all these cases, the leadership of one man or a small group is the most important single factor in the whole development.

Communities in the metropolitan Toronto area faced various serious problems—water supply, sewage disposal, transportation—which should be solved on a metropolitan basis. They realized that it would be most difficult, if not impossible, to obtain the needed kind of broad thinking, cooperation and coordination unless some improved mechanism was devised which could effectively cope with such problems on a metropolitan or regional basis.

Various ideas were proposed to meet the situation. The Province of Ontario has a board which deals with municipal problems. It's known as the Ontario Municipal Board. It has very great powers. This Board considered various proposed methods for meeting the metropolitan area problem, acting in a semi-judicial capacity. One proposal, strongly supported by the City of Toronto, called for amalgamation of the numerous local governmental agencies into a single metropolitan government for the Toronto area. In an excellent report dated January 20, 1953, the Ontario Municipal Board decided against this concept and instead decided that for purely local matters, existing municipalities should retain their complete jurisdiction, but that there should be superimposed the Municipality of Metropolitan Toronto which would have powers only concerning matters of a metropolitan nature. The metropolitan municipality taxes not the public but the constituent municipalities. The intent of the Board was to retain the good that there is in local communities with their closer contact with their citizenry as to local matters, and to provide the additional needed power for metropolitan action with the least possible complication of governmental structure, through the creation of the metropolitan municipality with limited powers.

There has been considerable tendency in the United States, when faced with a particular problem in a metropolitan area, to decide to have an area-wide authority or board or agency, giving it special powers to take care of that particular need. Thus we have metropolitan water supply systems, flood control districts, metropolitan park systems, metropolitan sewage disposal agencies. Since there are numerous special problems of a metropolitan nature, the practical question arises of whether to increase the number of special-purpose metropolitan agencies or to seek another answer. In the case of the Toronto metropolitan area, the decision was to create one over-all metropolitan agency which could take care of all such problems. Doesn't this idea warrant further consideration?

But to come back to our specific subject.

I wrote to Mr. Gardiner, after he had very kindly given me a great deal of very helpful information, and asked if the Municipality of Metropolitan Toronto was proving useful in the coordination of transportation planning. Permit me to quote these sentences from his reply:

"Our metropolitan form of government was established to provide the 13 constituent municipalities in metropolitan Toronto with the metropolitan services they require—one of the most important of which is coordinated transit and transportation facilities. Our Metropolitan Planning Board, with an eminently qualified Planning Director and Staff, continuously directs its

attention in all planning matters to the provision and coordination of adequate transportation facilities whether they be public transit, arterial highways or commuter rail services. Under our metropolitan form of government, progress in coordination of transportation facilities is being made, which was completely impossible when we had 13 local autonomous municipalities all geared to local plans and developments."

The experience of the Municipality of Metropolitan Toronto will, I am sure, be well worth watching, not only from a point of view of transportation but also from an even broader viewpoint.

Would that space permitted discussing other important developments relating to coordination of transportation planning. I was greatly helped and stimulated by my conference with Frederick Aschman, Executive Director, Chicago Plan Commission. He brought out, for example, the value of advance planning of transportation facilities, citing Skokie, a community which mushroomed following the provision of rapid transit to Chicago. Mr. Aschman and his associate, Harvey C. Brown, proved most stimulating in their constructive ideas on transportation in relation to city and metropolitan development. The need for much better coordination of transportation was involved in much of the discussion with these gentlemen—and it was most interesting to note the attention which they are giving as to how to bring about this and other improved functioning on metropolitan problems.

What is the outlook for the future?

Mr. Grant Mickle effectively brought out that as to transportation problems of urban and metropolitan areas, there have not been available the essential basic facts, and that a proper plan must be devised so that these facts will become available and so that they will be kept satisfactorily current. Today, remembering that more than half of the vehicle-miles of highway traffic are in urban and metropolitan areas, and with the outlook for a further large growth in highway traffic, it is important that these basic facts be made available as soon as possible.

For years now, the planning survey work of state highway departments has been based upon fundamental factual information, the pattern for which was developed in 1935. Though forward-looking leaders had long recognized the need for such basic facts, it took some years to get these into effective use by states. It is a bit ironical that where the highway transportation problem is much more severe, it is only now that a parallel urban fact-gathering program is being formulated. Once obtained and put to use, such basic facts will help greatly, not only in solving transportation problems but in demonstrating more clearly the great need for much increased emphasis upon coordinated metropolitan transportation. The more information of this sort that becomes available and the more attention given to it, the more obvious it will also become that there must be a better integration and coordination in transportation planning.

Developments in various parts of the country, some of which have been mentioned herein, give promise, I think, that there will emerge new mechanisms or patterns which will result in far better transportation planning, and coordination of such planning, in communities and metropolitan areas. To put it bluntly, the requirements of the situation will force such action.

Fortunately, there is a growing realization among increasing numbers of students and leaders of the need of an integrated transportation plan and program. While they will not come rapidly, such developments are sure to come.

Here again is a challenge to planners. For there is no established pattern for coordination of transportation planning, and the evolution in each area is bound to be the result of applying brain-power of the most interested persons in each locality.

PROCEEDINGS PAPERS

The technical papers published in the past year are identified by number below. Technical-division sponsorship is indicated by an abbreviation at the end of each Paper Number, the symbols referring to: Air Transport (AT), City Planning (CP), Construction (CO), Engineering Mechanics (EM), Highway (HW), Hydraulics (HY), Irrigation and Drainage (IR), Power (PO), Sanitary Engineering (SA), Soil Mechanics and Foundations (SM), Structural (ST), Surveying and Mapping (SU), and Waterways and Harbors (WW) divisions. Papers sponsored by the Board of Direction are identified by the symbols (BD). For titles and order coupons, refer to the appropriate issue of "Civil Engineering." Beginning with Volume 82 (January 1956) papers were published in Journals of the various Technical Divisions. To locate papers in the Journals, the symbols after the paper numbers are followed by a numeral designating the issue of a particular Journal in which the paper appeared. For example, Paper 861 is identified as 861 (SM1) which indicates that the paper is contained in issue 1 of the Journal of the Soil Mechanics and Foundations Division.

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MAY: 679(ST), 680(ST), 681(ST), 682(ST)^c, 683(ST), 684(ST), 685(SA), 686(SA), 687(SA), 688(SA), 689(SA)^c, 690(EM), 691(EM), 692(EM), 693(EM), 694(EM), 695(EM), 696(PO), 697(PO), 698(SA), 699(PO)^c, 700(PO), 701(ST)^c.

JUNE: 702(HW), 703(HW), 704(HW)^c, 705(IR), 706(IR), 707(IR), 708(IR), 709(HY)^c, 710(CP), 711(CP), 712(CP), 713(CP)^c, 714(HY), 715(HY), 716(HY), 717(HY), 718(SM)^c, 719(HY)^c, 720(AT), 721(AT), 722(SU), 723(WW), 724(WW), 725(WW), 726(WW)^c, 727(WW), 728(IR), 729(IR), 730(SU)^c, 731(SU).

JULY: 732(ST), 733(ST), 734(ST), 735(ST), 736(ST), 737(PO), 738(PO), 739(PO), 740(PO), 741(PO), 742(PO), 743(HY), 744(HY), 745(HY), 746(HY), 747(HY), 748(HY)^c, 749(SA), 750(SA), 751(SA), 752(SA)^c, 753(SM), 754(SM), 755(SM), 756(SM), 757(SM), 758(CO)^c, 759(HM)^c, 760(WW)^c.

AUGUST: 761(BD), 762(ST), 763(ST), 764(ST), 765(ST)^c, 766(CP), 767(CP), 768(CP), 769(CP), 770(CP), 771(EM), 772(EM), 773(SA), 774(EM), 775(EM), 776(EM)^c, 777(AT), 778(AT), 779(SA), 780(SA), 781(SA), 782(SA)^c, 783(HW), 784(HW), 785(CP), 786(ST).

SEPTEMBER: 787(PO), 788(IR), 789(HY), 790(HY), 791(HY), 792(HY), 793(HY), 794(HY)^c, 795(EM), 796(EM), 797(EM), 798(EM), 799(EM)^c, 800(WW), 801(WW), 802(WW), 803(WW), 804(WW), 805(WW), 806(HY), 807(PO)^c, 808(IR)^c.

OCTOBER: 809(ST), 810(HW)^c, 811(ST), 812(ST)^c, 813(ST)^c, 814(EM), 815(EM), 816(EM), 817(EM), 818(EM), 819(EM)^c, 820(SA), 821(SA), 822(SA)^c, 823(HW), 824(HW).

NOVEMBER: 825(ST), 826(HY), 827(ST), 828(ST), 829(ST), 830(ST), 831(ST)^c, 832(CP), 833(CP), 834(CP), 835(CP)^c, 836(HY), 837(HY), 838(HY), 839(HY), 840(HY), 841(HY)^c.

DECEMBER: 842(SM), 843(SM)^c, 844(SU), 845(SU)^c, 846(SA), 847(SA), 848(SA)^c, 849(ST)^c, 850(ST), 851(ST), 852(ST), 853(ST), 854(CO), 855(CO), 856(CO)^c, 857(SU), 858(BD), 859(BD), 860(BD).

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JANUARY: 861(SM1), 862(SM1), 863(EM1), 864(SM1), 865(SM1), 866(SM1), 867(SM1), 868(HW1), 869(ST1), 870(EM1), 871(HW1), 872(HW1), 873(HW1), 874(HW1), 875(HW1), 876(EM1)^c, 877(HW1)^c, 878(ST1)^c.

FEBRUARY: 879(CP1), 880(HY1), 881(HY1)^c, 882(HY1), 883(HY1), 884(IR1), 885(SA1), 886(CP1), 887(SA1), 888(SA1), 889(SA1), 890(SA1), 891(SA1), 892(SA1), 893(CP1), 894(CP1), 895(PO1), 896(PO1), 897(PO1), 898(PO1), 899(PO1), 900(PO1), 901(PO1), 902(AT1)^c, 903(IR1)^c, 904(PO1)^c, 905(SA1)^c.

MARCH: 906(WW1), 907(WW1), 908(WW1), 909(WW1), 910(WW1), 911(WW1), 912(WW1), 913(WW1)^c, 914(ST2), 915(ST2), 916(ST2), 917(ST2), 918(ST2), 919(ST2), 920(ST2), 921(SU1), 922(SU1), 923(SU1), 924(ST2)^c.

APRIL: 925(WW2), 926(WW2), 927(WW2), 928(SA2), 929(SA2), 930(SA2), 931(SA2), 932(SA2)^c, 933(SM2), 934(SM2), 935(WW2), 936(WW2), 937(WW2), 938(WW2), 939(WW2), 940(SM2), 941(SM2), 942(SM2)^c, 943(EM2), 944(EM2), 945(EM2), 946(EM2)^c, 947(PO2), 948(PO2), 949(PO2), 950(PO2), 951(PO2), 952(PO2)^c, 953(HY2), 954(HY2), 955(HY2)^c, 956(HY2), 957(HY2), 958(SA2), 959(PO2), 960(PO2).

MAY: 961(IR2), 962(IR2), 963(CP2), 964(CP2), 965(WW3), 966(WW3), 967(WW3), 968(WW3), 969(WW3), 970(ST3), 971(ST3), 972(ST3)^c, 973(ST3), 974(ST3), 975(WW3), 976(WW3), 977(IR2), 978(AT2), 979(AT2), 980(AT2), 981(IR2), 982(IR2)^c, 983(HW2), 984(HW2), 985(HW2)^c, 986(ST3), 987(AT2), 988(CP2), 989(AT2).

c. Discussion of several papers, grouped by Divisions.

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